CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.09/KRIDL/CSR-10/177a/CEMENT/2016-17 Date: 28.10.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
*NAME OF THE WORK	:	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	26.10.2016
PERIOD OF TESTING	:	26.10.2016 to 28.10.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	150 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	480 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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VISHWANATH C.
Quality Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/KRIDL/CSR-10/177a/SAND-Gradation/2016-17 : 28.10.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Technical Manager,** KRIDL, Bangalore.
* Name of Work	: Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Technical Reference	: IS : 2386 Part 1 - 1963 RA-2007
Sample ID	: Fine Aggregates
Sample Received on	: 26.10.2016
Date of Testing	: 28.10.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	95.70	90-100	90-100	90-100	95-100
2.36	77.50	60-95	75-100	85-100	95-100
1.18	58.50	30-70	55-90	75-100	90-100
600 Micron	30.50	15-34	35-59	60-79	80-100
300 Micron	15.00	5-20	8-30	12-40	15-50
150 Micron	6.00	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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AEE (VRP) SD

VISHWANATH C.
Quality Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2016-17 : 30.10.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016

Date of Testing : 30.10.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	50	50	1.0	99.0	95-100
22.4	1855	1905	38.1	61.9	60-80
11.2	970	2875	57.5	42.5	40-60
4.75	185	3060	61.2	38.8	25-40
2.36	475	3535	70.7	29.3	15-30
0.600	625	4160	83.2	16.8	8-22
0.075	670	4830	96.6	3.4	0-8

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/AIV/2016-17 30.10.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP,
Reference	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	30.10.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	21.20	21.41	
	100* (W_2/W_1)%			**21.31**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/S-T/2016-17 30.10.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP,
Reference	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	30.10.2016

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.55%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index 24.81%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/AIV/2016-17 10.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP,
Reference	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	10.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	20.58	20.68	20.63

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Shape_T/2016-17 : 10.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 10.11.2016

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Result : Flakiness Index = 12.32%

Elongation Index = 13.30%

Result : Combined Flakiness & Elongation index 25.62%

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Stripping/2016-17 10.11.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	10.11.2016

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Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

Jadhav

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Sp_Wa/2016-17 10.11.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	10.11.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2006	2007	2008	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1251	1252	1253	
4	Weight of saturated surface dry aggregate in air	W_3 g	2013	2014	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	762	762	762	
6	Weight of oven dried aggregate	W_4 g	2000	2003	2002	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.625	2.629	2.627	2.627
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.670	2.667	2.673	2.670
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.65%	0.55%	0.65%	0.62%

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Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.

Tele Fax : 23223227, Website : www.civiltechconsultants.com

E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Bitumen/2016-17 10.11.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements & Asphalting to Veeranna Layout, Goutam Book store Road & Thindlu surroundings in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/67/2016-17 Dated: 11.07.2016
SAMPLE I/D	Roads in Veeranna layout Ward No.09.
DATE OF TESTING	10.11.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	473.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	26.50
7. Bitumen content in %	4.90	5.30
8. Average	5.10	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	35.26	7.42	7.42	92.58	90-100
4.75	259.6	54.60	62.01	37.99	35-51
2.36	35.16	7.39	69.40	30.60	24-39
1.18	43.26	9.10	78.50	21.50	15-30
0.3	41.22	8.67	87.17	12.83	9-19
0.075	31.22	6.57	93.74	6.26	3-8

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SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	30.89	6.18	6.18	93.82	90-100
4.75	265.8	53.16	59.34	40.66	35-51
2.36	60.32	12.06	71.40	28.60	24-39
1.18	53.26	10.65	82.05	17.95	15-30
0.3	32.56	6.51	88.57	11.43	9-19
0.075	30.22	6.04	94.61	5.39	3-8

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